

TimeTrade.com, Inc. operates as an application **service provider** (ASP) and offers a complete outsourced scheduling solution for **service providers**. Schedule data is maintained in a central database that is updated instantly as appointments are booked. Service businesses use TimeTrade to present their service offerings **online**, make **time** available, accept **appointments**, and **send** reminders in real- **time** on the Internet. TimeTrade manages both one- on-one appointments (i.e., haircuts, photo sessions...

11/3,K/4 (Item 4 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)
(c) 2004 The Gale Group. All rts. reserv.

07451114 Supplier Number: 62663956 (USE FORMAT 7 FOR FULLTEXT)
TimeTrade.com Integrates Web-based Appointment Scheduling Solution with Leading Site Locator Service.

PR Newswire, p7394
June 12, 2000
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 459

... way to use the Internet to drive business."
TimeTrade.com, Inc. operates as an application **service provider** (ASP) and offers a complete outsourced scheduling solution for **service providers**. Schedule data is maintained in a central database that is updated instantly as appointments are booked. Service businesses use TimeTrade to present their service offerings **online**, make **time** available, accept **appointments**, and **send** reminders in real- **time** on the Internet. TimeTrade manages both one-on-one appointments (i.e., haircuts, photo sessions...

11/3,K/5 (Item 5 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)
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07161495 Supplier Number: 60076000 (USE FORMAT 7 FOR FULLTEXT)
ADS TO DRIVE INTERNET.

Television Digest, v40, n11, pNA
March 13, 2000
Language: English Record Type: Fulltext
Document Type: Newsletter; Trade
Word Count: 4222

... meetings before issuing final report, with next meeting being April 14 at yet to be **determined** location.

AOL's merger with **Time** Warner (TW) could be justified by "tactical synergies" alone, meaning marketing and distribution savings, but...

...with company targeting every major appliance in home, including computer, TV, stereo and phone. As **ISP** adds new services, it's becoming harder for subscribers to leave, reducing churn rate, Pittman said. Customers with **calendars**, pictures and stock portfolios **online** find "if you want to give up AOL, you have to give up a whole...

11/3,K/6 (Item 1 from file: 20)
DIALOG(R)File 20:Dialog Global Reporter

(c) 2004 The Dialog Corp. All rts. reserv.

05729606 (USE FORMAT 7 OR 9 FOR FULLTEXT)

Send.com Makes Online Gift Giving Easier Than Ever With New Strategic Partnerships

PR NEWSWIRE

June 14, 1999

JOURNAL CODE: WPRW LANGUAGE: English RECORD TYPE: FULLTEXT

WORD COUNT: 828

... too often refrain from sending business gifts due to the lack of appropriate offerings or **time** commitment. **Send .com** solves these problems by providing unique and elegant solutions easily accessible via the Internet...

11/3,K/7 (Item 2 from file: 20)

DIALOG(R)File 20:Dialog Global Reporter

(c) 2004 The Dialog Corp. All rts. reserv.

02829993

Appoint.Net Launches Advanced On-Line Calendar Inks Deal With animalhouse.com

PR NEWSWIRE

September 16, 1998

JOURNAL CODE: WPRW LANGUAGE: English RECORD TYPE: FULLTEXT

WORD COUNT: 542

...Net, Inc. (www.appoint.net), a privately held company headquartered in Philadelphia, is a branded **service provider** of advanced **online scheduling** applications and services. An industry leader in high volume **online event calendar** distribution, **scheduling**, and **appointment** processing for both business and consumer users, Appoint.Net is a user's personal electronic...

11/3,K/8 (Item 3 from file: 20)

DIALOG(R)File 20:Dialog Global Reporter

(c) 2004 The Dialog Corp. All rts. reserv.

02802667

OutReach Technologies Launches Next Generation Real-Time Conferencing Solution; Users Reduce Operating Costs, Improve Productivity

BUSINESS WIRE

September 14, 1998

JOURNAL CODE: WBWE LANGUAGE: English RECORD TYPE: FULLTEXT

WORD COUNT: 839

... are scheduled and attendees receive email notifications in seconds with all the details, including passwords. **Electronic calendaring** also occurs with all vCalendar-compliant end points. Early Users Comment on CONFEREase Features Government...

... team experts efficiently and effectively collaborate using CONFEREase while remaining in their normal work locations. **Service Provider** CONFEREase offers significant enhancements for outsourcing **Service Providers**. comLinx.com of North Plainfield, NJ uses CONFEREase to provide interactive teleconferencing and meeting services...

11/3,K/9 (Item 1 from file: 95)
DIALOG(R)File 95:TEME-Technology & Management
(c) 2004 FIZ TECHNIK. All rts. reserv.

00939922 E95114173062

Real-time communication services in a DQDB network
(Echtzeitkommunikationsdienste in einem DQDB-Netz)
Carmo, RLR; Vasques, F; Juanole, G
LAAS du CNRS, Toulouse, F
1994 IEEE Real-Time Syst. Symp., Proc., San Juan, USA, Dec 7-9, 19941994
Document type: Conference paper Language: English
Record type: Abstract
ISBN: 0-8186-6602-1

ABSTRACT:

This paper addresses the problem of **transmitting** real- **time** periodic traffic in a DQDB network. In a DQDB network, connection-oriented isochronous services use...

...such as the slot allocation scheme, are not described. The authors propose a Real-Time **Service Provider** (RTSP) based on the use of the PA access. The RTSP consists of an off-line centralized **scheduling** algorithm and an **on - line** mode change algorithm which allows to take into account load changes. Means are also provided...

11/3,K/10 (Item 1 from file: 624)
DIALOG(R)File 624:McGraw-Hill Publications
(c) 2004 McGraw-Hill Co. Inc. All rts. reserv.

01038291

CUSTOMERS CAN CONTINUE TO USE THE PHONE FOR NEXT-HOUR RESERVATIONS
Inside FERC August 16, 1999; Pg 8; Vol. 25, No. 33
Journal Code: FERC ISSN: 0-163-948X
Section Heading: ELECTRIC POWER
Word Count: 316 *Full text available in Formats 5, 7 and 9*

TEXT:

...time.

The North American Electric Reliability Council reported to Ferc in May that both transmission **providers** and customers supported continuation of experimental procedures, which include the phone option for reservations and **scheduling**, until **electronic scheduling** tools are in place in a year or so (IF, 24 May, 3). If a next-hour reservation is **confirmed** verbally, the **transmission provider** can require the customer to enter the reservation on an open-access same-time information system after the fact within one hour of the start time. A **provider** also can require a customer to reserve and schedule requests electronically if its process allows...

11/3,K/11 (Item 2 from file: 624)
DIALOG(R)File 624:McGraw-Hill Publications
(c) 2004 McGraw-Hill Co. Inc. All rts. reserv.

00972813

FOUR-MONTH TRIAL SET ON PROCEDURES FOR NEXT-HOUR TRANSMISSION SERVICE
Inside FERC October 5, 1998; Pg 9; New Issues Supplement
Journal Code: FERC ISSN: 0-163-948X
Section Heading: ELECTRIC POWER

Word Count: 649 *Full text available in Formats 5, 7 and 9*

TEXT:

... and schedules electronically prior to the scheduling deadline. In such instances, customers can provide the **transmission provider** with a **confirmation** of the reservation or schedule by telephone or fax. If a reservation is entered in this manner, the transmission **provider** can require the customer to enter the reservation on the OASIS electronically, ``after the fact...

11/3,K/12 (Item 3 from file: 624)

DIALOG(R)File 624:McGraw-Hill Publications

(c) 2004 McGraw-Hill Co. Inc. All rts. reserv.

00949121

ELECTRIC GROUP MOVES TO STANDARDIZE PROCEDURES, AID NEXT-DAY MARKET

Inside FERC June 15, 1998; Pg 5; Vol. 187, No. 4

Journal Code: FERC ISSN: 0-163-948X

Section Heading: ELECTRIC POWER

Word Count: 1,285 *Full text available in Formats 5, 7 and 9*

TEXT:

...can enter the reservation and schedule requests either electronically or verbally. If a reservation is **confirmed** verbally, the **transmission provider** can require the customer to enter the reservation on OASIS electronically, after the fact, within an hour of the commencement **time**. In some circumstances, the **transmission provider** can require the customer to enter reservations and schedules **electronically** prior to the **scheduling** deadline. Then, if the **provider** doesn't respond within 15 minutes, the customer can call for a verbal confirmation. The...
?

15/3,K/1 (Item 1 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)
(c) 2004 The Gale Group. All rts. reserv.

08096990 Supplier Number: 67329806 (USE FORMAT 7 FOR FULLTEXT)
New tool gives marketing/public relations experts ability to manage hospital Web sites. (Brief Article)
Health Care Strategic Management, v18, n10, p4
Oct, 2000
Language: English Record Type: Fulltext
Article Type: Brief Article
Document Type: Newsletter; Trade
Word Count: 610

... they had received from the system's Web site.
In addition, Henry Ford is taking **appointment requests** online and has been **receiving** about 400 **requests** per month. The system said about 2% of all patients specifically cite its Internet site...

15/3,K/2 (Item 2 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)
(c) 2004 The Gale Group. All rts. reserv.

07428286 Supplier Number: 62442519 (USE FORMAT 7 FOR FULLTEXT)
The Doctor Is Online: Blue Shield of California First Health Plan to Link Doctors and Members.
PR Newswire, pNA
May 31, 2000
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 842

... personalized messaging, members and other patients of Blue Shield doctors will be able to request **online** consultations, schedule **appointments**, **request** prescriptions and renewals, and **receive** individualized health information online.
"Blue Shield has been a pioneer in harnessing the Internet to...

15/3,K/3 (Item 3 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)
(c) 2004 The Gale Group. All rts. reserv.

06710572 Supplier Number: 56175345 (USE FORMAT 7 FOR FULLTEXT)
Health Systems and Medical Groups Open Internet To Patient-Provider Connectivity.
PR Newswire, p3647-
Oct 11, 1999
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 513

... conditions. In Southern California, Kaiser now has a web site where members can complete an **online** health **assessment**, make **appointments**, and join over 30 disease-specific discussion groups. In Portland, ME, a 25-physician primary...

15/3,K/4 (Item 1 from file: 148)

DIALOG(R)File 148:Gale Group Trade & Industry DB
(c)2004 The Gale Group. All rts. reserv.

12382743 SUPPLIER NUMBER: 63555663 (USE FORMAT 7 OR 9 FOR FULL TEXT)
BizLand, Inc. Selects TimeTrade.com to Bring Web-Based Appointment

Scheduling to Service Merchants.

PR Newswire, 2185

July 19, 2000

LANGUAGE: English RECORD TYPE: Fulltext

WORD COUNT: 604 LINE COUNT: 00055

... updated instantly as appointments are booked. Service businesses use TimeTrade to present their service offerings **online**, make **time** available, accept **appointments**, and send reminders in real- **time** on the Internet. TimeTrade manages both one- on-one appointments (i.e., haircuts, photo sessions...

15/3,K/5 (Item 2 from file: 148)

DIALOG(R)File 148:Gale Group Trade & Industry DB
(c)2004 The Gale Group. All rts. reserv.

12217597 SUPPLIER NUMBER: 62663956 (USE FORMAT 7 OR 9 FOR FULL TEXT)
TimeTrade.com Integrates Web-based Appointment Scheduling Solution with

Leading Site Locator Service.

PR Newswire, 7394

June 12, 2000

LANGUAGE: English RECORD TYPE: Fulltext

WORD COUNT: 503 LINE COUNT: 00046

... updated instantly as appointments are booked. Service businesses use TimeTrade to present their service offerings **online**, make **time** available, accept **appointments**, and **send** reminders in real- **time** on the Internet. TimeTrade manages both one-on-one appointments (i.e., haircuts, photo sessions...

15/3,K/6 (Item 3 from file: 148)

DIALOG(R)File 148:Gale Group Trade & Industry DB
(c)2004 The Gale Group. All rts. reserv.

10123659 SUPPLIER NUMBER: 20426467 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Teach your patients well. (automated education tools for health clinicians)

(included related articles on Web-based patient education applications, and on the A.D.A.M. Interactive Anatomy CD-ROM) (Technology Information) (Cover Story)

Sandrick, Karen

Health Management Technology, v19, n4, p16(4)

March, 1998

DOCUMENT TYPE: Cover Story ISSN: 1074-4770 LANGUAGE: English

RECORD TYPE: Fulltext; Abstract

WORD COUNT: 2612 LINE COUNT: 00212

... to-date and, even more important, valid.

KP Online is prototyping a system that will **electronically** process pharmaceutical refills and **transmit appointment scheduling requests** right into its legacy system to improve customer service.

Soon, she expects to automate more...

15/3,K/7 (Item 4 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB
(c)2004 The Gale Group. All rts. reserv.

09874969 SUPPLIER NUMBER: 19998479 (USE FORMAT 7 OR 9 FOR FULL TEXT)
HealthCompass Launched at Celebration Health
PR Newswire, p1119NYW002
Nov 19, 1997
LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 1672 LINE COUNT: 00150

... communication between consumers and their healthcare team. Using the HealthCompass secure message center, users can **electronically** schedule **appointments**, **request** and **receive** pre-certification and obtain physician referrals, and request a prescription refill simply by sending an...

15/3,K/8 (Item 5 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB
(c)2004 The Gale Group. All rts. reserv.

08528738 SUPPLIER NUMBER: 18043356 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Changes in the Model Business Corporation Act - amendments pertaining to shareholder meetings and voting. (changes proposed by the Committee on Corporate Laws)
Business Lawyer, 51, n1, 209-221
Nov, 1995
ISSN: 0007-6899 LANGUAGE: English RECORD TYPE: Fulltext; Abstract
WORD COUNT: 5525 LINE COUNT: 00439

... information by the recipient. See section 40(7A). The appointment is effective when it an **appointment** form or an **electronic transmission** (or documentary evidence thereof, including **verification** information) is received by the inspector of election or the officer or agent of the...

15/3,K/9 (Item 6 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB
(c)2004 The Gale Group. All rts. reserv.

07179796 SUPPLIER NUMBER: 15073806 (USE FORMAT 7 OR 9 FOR FULL TEXT)
The Medical Center takes proactive approach to healthcare reform. (Beaver, PA, hospital provides excellent healthcare with controlled costs)
(includes related article on applying manufacturing practices to the healthcare industry)
Taylor, Susan
Industrial Engineering, v26, n1, p20(4)
Jan, 1994
ISSN: 0019-8234 LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT; ABSTRACT
WORD COUNT: 4283 LINE COUNT: 00345

... master scheduling system, an appointment date is negotiated. Similar to a sales order acknowledgment an **appointment acknowledgment** could be **electronically transmitted** to the physician's office for the patient, which could contain information regarding the scheduled...

15/3,K/10 (Item 7 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB

(c)2004 The Gale Group. All rts. reserv.

05536327 SUPPLIER NUMBER: 11593950 (USE FORMAT 7 OR 9 FOR FULL TEXT)
WordPerfect Corp. announces upgrades for Unix workstations. (WordPerfect 5.1 for Unix; WordPerfect Office for Unix) (Product Announcement)

Schwartz, Karen D.

Government Computer News, v10, n24, p33(2)

Nov 25, 1991

DOCUMENT TYPE: Product Announcement ISSN: 0738-4300

LANGUAGE:

ENGLISH RECORD TYPE: FULLTEXT; ABSTRACT

WORD COUNT: 633 LINE COUNT: 00050

... by next month, has complete mail and scheduling functions. The new version lets the user **send electronic** -mail messages and **scheduling requests** to users on other platforms. It will include WordPerfect Connections, software that provides host-to...

15/3,K/11 (Item 8 from file: 148)

DIALOG(R)File 148:Gale Group Trade & Industry DB

(c)2004 The Gale Group. All rts. reserv.

05121753 SUPPLIER NUMBER: 10507404 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Meeting Maker scheduler debuts for Mac platform. (On Technology Inc's Meeting Maker software) (product announcement)

Higgins, Steve

PC Week, v8, n12, p45(2)

March 25, 1991

DOCUMENT TYPE: product announcement ISSN: 0740-1604

LANGUAGE:

ENGLISH RECORD TYPE: FULLTEXT

WORD COUNT: 404 LINE COUNT: 00032

... Mitch Kapor's 3-year-old firm, is designed to provide the standard array of **scheduling** tools to help users **automate** the process of **determining** the best **time** and place for meetings, company officials said.

Meeting Maker departs from the throng of PC...

15/3,K/12 (Item 9 from file: 148)

DIALOG(R)File 148:Gale Group Trade & Industry DB

(c)2004 The Gale Group. All rts. reserv.

03726475 SUPPLIER NUMBER: 06611446 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Chronic fatigue in primary care; prevalence, patient characteristics, and outcome.

Kroenke, Kurt; Wood, David R.; Mangelsdorff, A. David; Meier, Nancy J.; Powell, John B.

JAMA, The Journal of the American Medical Association, v260, n7, p929(6)

Aug 19, 1988

ISSN: 0098-7484 LANGUAGE: ENGLISH

RECORD TYPE: FULLTEXT; ABSTRACT

WORD COUNT: 4713 LINE COUNT: 00389

... was unchanged, or worsened, and they again completed the two fatigue scales. The hospital's **computerized** central **appointment** system was used to **determine** the number of outpatient visits. Hospitalization episodes were identified through a computerized inpatient registry, and...

15/3,K/13 (Item 1 from file: 275)

DIALOG(R)File 275:Gale Group Computer DB(TM)
(c) 2004 The Gale Group. All rts. reserv.

01363162 SUPPLIER NUMBER: 08531168 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Groupware gropes for recognition: Sall from Lotus: 'more philosophy than product'.
Ambrosio, Johanna
Software Magazine, v10, n7, p21(4)
June, 1990
ISSN: 0897-8085 LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT; ABSTRACT
WORD COUNT: 1891 LINE COUNT: 00150

... nd schedules the first available date that is free for everyone,
and then enters the **date** on their **calendars** and **sends** group members
an **electronic** mail memo, notifying them of the appointment.
Another difference between groupware and LAN software is...

15/3,K/14 (Item 2 from file: 275)
DIALOG(R)File 275:Gale Group Computer DB(TM)
(c) 2004 The Gale Group. All rts. reserv.

01210193 SUPPLIER NUMBER: 06012234 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Putting zip into e-mail.
Snyders, Jan
Infosystems, v34, p28(4)
Aug, 1987
ISSN: 0364-5533 LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT; ABSTRACT
WORD COUNT: 2226 LINE COUNT: 00173

... requires micros or 3270 terminals. Features include a list of all
mail IDs and an **electronic calendar** for **scheduling** or **sending**
letters at a later **time**. The user can define events that occur frequently
so they appear automatically on the electronic...

15/3,K/15 (Item 1 from file: 636)
DIALOG(R)File 636:Gale Group Newsletter DB(TM)
(c) 2004 The Gale Group. All rts. reserv.

03811030 Supplier Number: 48264215 (USE FORMAT 7 FOR FULLTEXT)
NEW INTERNET SERVICE OFFERS SECURE HEALTH RECORD ARCHIVE
Online Product News, v17, n2, pN/A
Feb 1, 1998
Language: English Record Type: Fulltext
Document Type: Newsletter; Trade
Word Count: 1467

... communication between consumers and their healthcare team. Using
the HealthCompass secure message center, users can **electronically**
schedule **appointments**, **request** and **receive** pre-certification and
obtain physician referrals, and request a prescription refill simply by
sending an...

15/3,K/16 (Item 2 from file: 636)
DIALOG(R)File 636:Gale Group Newsletter DB(TM)
(c) 2004 The Gale Group. All rts. reserv.

03788406 Supplier Number: 48205745 (USE FORMAT 7 FOR FULLTEXT)

"HEALTHMAGIC" OFFERS CENTRALIZED HEALTH INFO RECORDS

Worldwide Databases, v10, pN/A

Jan 1, 1998

Language: English Record Type: Fulltext

Document Type: Newsletter; Trade

Word Count: 1467

... communication between consumers and their healthcare team. Using the HealthCompass secure message center, users can **electronically** schedule **appointments**, **request** and **receive** pre-certification and obtain physician referrals, and request a prescription refill simply by sending an...

15/3,K/17 (Item 1 from file: 15)

DIALOG(R)File 15:ABI/Inform(R)

(c) 2004 ProQuest Info&Learning. All rts. reserv.

01718601 03-69591

Cost-effective WDM broadcast-and-select network for all-to-all transmission schedules

Xiao, Gaoxi; Leung, Yiu-Wing

Journal of Systems Architecture v45n2 PP: 115-129 Oct 30, 1998

ISSN: 1383-7621 JRNL CODE: EUJ

...ABSTRACT: reception with tuning. An alternative and cheaper network configuration is studied to hide the tuning **time** for all-to-all **transmission scheduling**. In this configuration, every **electronic** transmitter (receiver) is connected to 1 tunable lasers, so that transmission/reception with tuning can...

15/3,K/18 (Item 2 from file: 15)

DIALOG(R)File 15:ABI/Inform(R)

(c) 2004 ProQuest Info&Learning. All rts. reserv.

01646015 02-97004

Interactive services make in-roads on managed care

Brakeman, Lynne

Managed Healthcare v8n5 PP: 46-47 May 1998

ISSN: 1060-1392 JRNL CODE: MHR

WORD COUNT: 1065

...TEXT: Users in all three regions can use a Web browser to contact advice nurses and **receive** responses via e-mail, **request appointments online**, order prescription refills, and fill out forms that provide immediate health-risk assessments. And all...

15/3,K/19 (Item 3 from file: 15)

DIALOG(R)File 15:ABI/Inform(R)

(c) 2004 ProQuest Info&Learning. All rts. reserv.

01532518 01-83506

Putting health information in consumers' hands

Mycek, Shari

Healthcare Forum Journal v40n6 PP: C16 Nov/Dec 1997

ISSN: 0899-9287 JRNL CODE: HPF

WORD COUNT: 1939

...TEXT: and medical information delivered through HealthMagic's partner, Direct Medical Knowledge, Inc.

4) Ability to **electronically** schedule **appointments** , **request** and **receive** precertification and **receive** referrals.

5) Pre-visit Symptom Description, guided by a set of predetermined questions, enabling consumers...

15/3,K/20 (Item 4 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)
(c) 2004 ProQuest Info&Learning. All rts. reserv.

00807081 94-56473
Applying manufacturing practices to the healthcare industry
Lee, Patricia Kelly
Industrial Engineering v26n1 PP: 21 Jan 1994
ISSN: 0019-8234 JRNL CODE: INE
WORD COUNT: 494

...TEXT: master scheduling system, an appointment date is negotiated. Similar to a sales order acknowledgment an **appointment acknowledgment** could be **electronically transmitted** to the physician's office for the patient, which could contain information regarding the scheduled...

15/3,K/21 (Item 1 from file: 20)
DIALOG(R)File 20:Dialog Global Reporter
(c) 2004 The Dialog Corp. All rts. reserv.

11264089 (USE FORMAT 7 OR 9 FOR FULLTEXT)
Beauty: Open wide, gorgeous: Brave the dentist - and get a facelift
PRECIOUS WILLIAMS
INDEPENDENT ON SUNDAY
May 28, 2000
JOURNAL CODE: FINS LANGUAGE: English RECORD TYPE: FULLTEXT
WORD COUNT: 440

(USE FORMAT 7 OR 9 FOR FULLTEXT)

... Street surgery costs pounds 75 (the full treatment is pounds 2,300). At the first **appointment** suitability is **assessed** via a **computerised** imaging of your face and profile. On the second visit the blocks are positioned in...

15/3,K/22 (Item 1 from file: 95)
DIALOG(R)File 95:TEME-Technology & Management
(c) 2004 FIZ TECHNIK. All rts. reserv.

00970006 I96033556248
Optimal sequencing of double-gripper gantry robot moves in tightly-coupled serial production systems
(Optimale Bewegungsfolge eines Roboters mit zwei Greifern im eng gekoppten Serienproduktionssystem)
Qi Su; Chen, FF
Dept. of Ind. & Syst. Eng., Florida Int. Univ., Miami, FL, USA
IEEE Transactions on Robotics and Automation, v12, n1, pp22-30, 1996
Document type: journal article Language: English

Record type: Abstract
ISSN: 1042-296X

...IDENTIFIERS: SEQUENCING; DOUBLE GRIPPER GANTRY ROBOT MOVES; TIGHTLY
COUPLED SERIAL PRODUCTION SYSTEMS; DOUBLE GRIPPER GANTRY ROBOT **SCHEDULING**
; TIGHTLY COUPLED **AUTOMATED** SERIAL PRODUCTION LINE **SCHEDULING** ;
DETERMINISTIC PROCESSING **TIME** ; Roboterregelung; optimaler
Bewegungsablauf

15/3,K/23 (Item 1 from file: 813)
DIALOG(R)File 813:PR Newswire
(c) 1999 PR Newswire Association Inc. All rts. reserv.

1187921 NYTU085
HealthMagic, Inc. Unveils HealthCompass(TM) at Celebration Health:
Internet-based Consumer Health Management Tool

DATE: November 18, 1997 10:56 EST WORD COUNT: 270

...assessment tools; communicate via secure e-mail

messaging to physicians and other healthcare professionals; and

electronically schedule **appointments** and request referrals.
Intelligent

agents **assess** data in the lifelong health record to personalize
health

information to each consumer, allowing the...

?

STN Search

=> d hist

(FILE 'HOME' ENTERED AT 15:02:19 ON 18 MAY 2004)

FILE 'CONFSCI' ENTERED AT 15:02:26 ON 18 MAY 2004

L1 648 S SERVICE() PROVIDER? OR WEBHOST? OR WEB()HOST? OR ISP OR INTERN
L2 27 S (ONLINE OR ON()LINE OR AUTOMATE? OR COMPUTERI? OR ELECTRONIC?
L3 0 S L1 AND L2

6/9/4 (Item 4 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)
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00810500 94-59892

Small-sized LAN support for a research center

Harris, Carolyn R; Jordan, Donald L; Pinson, Thomas J III
Journal of Systems Management v45n1 PP: 14-17+ Jan 1994 CODEN: JSYMA9
ISSN: 0022-4839 JRNL CODE: JSM
DOC TYPE: Journal article LANGUAGE: English LENGTH: 5 Pages
WORD COUNT: 3649

ABSTRACT: The Gulf Coast Hazardous Substance Research Center's (GCHSRC) local area network (LAN) consists of 7 user workstations, a network server, and 3 printers in an IBM-compatible environment supported by Novell Netware. Users can be assigned 3 levels of responsibility on the LAN: 1. regular network users, 2. operators, and 3. network supervisors. GCHSRC uses WordPerfect Office LAN as its electronic messaging system. This provides communications capabilities to all network users, including electronic mail, electronic calendaring, and a notebook. The custom-built Project Management Information System is a menu-driven system designed to support the Director in collecting, storing, processing, and manipulating information on research proposals and projects. Issues relating to user training, alternative approaches, implementation problems, costs, user satisfaction, disadvantages of the LAN, and future plans are also discussed.

TEXT: Local Area Networks (LANs) are widely used to facilitate the sharing of hardware, software, and data, as well as to provide a means of communication among members of a workgroup.

The LAN discussed in this paper belongs to the Gulf Coast Hazardous Substance Research Center (GCH SRC), a consortium of Gulf Coast universities headquartered at Lamar University--Beaumont, Texas. The Center is funded by federal, state and private industry grants, has an annual budget of more than \$3 million, and is in a growth mode.

Research done through the Center is concentrated in the areas of Waste Minimization and Treatment Technology development. Research is done by the faculties of the member universities on their campuses. Proposals for research projects within the framework of the Center's program are submitted for review by the Science and Industrial Advisory Committees. These committees advise the Center Director on the technical and scientific quality of the proposals and assist him in selecting the projects which will make up the program.

INITIAL SETUP

The Research Center was originally established in a single office with a director and a secretary. The first computerized communications in the Center were between the Director and the secretary using a product called Desklink, which enabled the Director to send messages and commands. Through the use of modems and a phone line, Desklink allowed one computer to access the hard drive of another. In this implementation, it was necessary for the Director to tell the secretary what each file was called on his computer so she could then bring it up on her hard drive.

GROWTH OF THE CENTER

Later, when the Center had grown to a size requiring larger quarters, the move to a new site was thought an ideal time to set up a Local Area Network. Communication and sharing of large amounts of data have played important roles in the Center since its beginning. Additionally, the traditional advantages of a LAN such as sharing of peripherals were deemed beneficial.

A computer consultant (a faculty member at the Center's home university) and the Center's Assistant Director were primarily responsible for planning and implementing the LAN. They chose an IBM-compatible environment

supported by Novell Netware.
CONFIGURATION & MECHANICS OF THE GCHSRC'S LAN

At present, the Research Center's LAN consists of seven user workstations (PCs), a network server and 3 printers. The network server serves primarily as a data store, with some data **available** to all, and other data stored in individual subdirectories. Most of the software used in the network is installed on the individual workstations rather than on the network server.

Each of the workstations can be used in a stand-alone manner but is also able to access shared storage and output devices. There are some programs common to all the workstations (for example, those provided by the electronic messaging system). Other software may be on some PCs but not on others. Each user has the freedom to structure his or her menu in the way which is individually preferred.

PERSONNEL

The original Director of the Center has assumed a semi-retired status and has moved out of the state. His duties include establishing broad guidelines for focus and operation of the Center, but he is not overly involved with day-to-day operation. He communicates with the Center via the network, logging on through a modem. A dialogue screen allows online "conversation" with the Assistant Director. Other options include accessing his electronic calendar and E-mail. Frequently, he may find an E-Mail message regarding a document (file) requiring his attention. This file can be transferred via modem, reviewed/revised, and transmitted back to the Center. Generally, the Director communicates daily with the Center. The capabilities of the network allow him to still be involved with the operation of the Center even though he is geographically removed.

The Assistant Director tends to day-to-day management tasks and also serves as the Network Systems Administrator. He is in charge of data/files, training and network users. He uses the E-mail facility extensively to communicate with staff members regarding assignments. For example, he may type a draft of a letter, save it in a particular subdirectory on the network server, and send a message to the secretary telling her where/how to retrieve the letter for editing and printing.

Additional personnel include:

1) An Administrative Technician who tracks payroll, purchasing and other accounts of the Center with the help of the Network. She uses Form Filler (from BLOC Corporation) to generate such items as purchase requisitions, travel vouchers, employee forms and personnel reports. This program is not loaded on every user's network. Additionally, she uses a spreadsheet program, the custom-built Project Management Information System (PMIS), and some word processing. All of her programs are on the network because she shares input/output extensively with the Assistant Director. A strong advantage of using the LAN for her work is that she is charged with making changes to the PMIS, which is accessed frequently by others. By having the file only on the network (other than the backup copy), changes can be made to that copy with the assurance that all users have access to current rather than outdated information.

2) An Administrative Secretary who uses the Network programs to keep track of the Center's clients and to manage mailouts. She uses the **electronic calendar** extensively to **schedule** and maintain awareness of **appointments** for the Director and Assistant Director. In addition, she has a variety of office automation software (some off the shelf and some developed in-house) to suit her individual needs. She also supervises other clerical personnel working with mailing lists for the extensive collection of clients, researchers, and other contacts.

3) A Special Assistant to the Director who uses the Network to organize all the publications resulting from research conducted with funds from the Center and to keep track of all researchers and their work. All publications resulting from research sponsored by the Center are sent to

the GCHSRC, where they are cataloged and installed into a database. Thereafter anyone desiring the publications can access them through the network, via modem if needed.

4) Other Clerical Personnel, full-time and part-time.

NETWORK USERS AND INFORMATION PROTECTION

To use the files on the network, or access the network, a person must have the appropriate hardware and software and be designated as a network user. Users can be assigned three levels of responsibility on the network-

- * regular network users,
- * operators and
- * network supervisors.

Regular network users can run applications and work with files according to the rights assigned to them. Operators are regular network users who have been assigned additional privileges. Network supervisors are responsible for the smooth operation of the network, restructuring, and updating when needed.

All data files on the network are stored at a central location--the network server's hard disk. However, all users are not given access to all the data. Users also cannot access a data file simultaneously while in the update mode, to prevent overwriting of each other's work. They can simultaneously access a data file while in the query mode.

There is an extensive security system to protect the data on the network. It consists of a combination of passwords and trustee rights assigned to the user and the attributes assigned to directories and files. It is also possible to restrict when and how users can work on the network.

MESSAGING SOFTWARE

GCHSRC uses WordPerfect Office LAN as its electronic messaging system. This provides certain communication capabilities to all network users, including electronic mail, electronic calendaring, and a notebook. There are six levels of security and messages can be encrypted. Users access the various functions via menu.

ELECTRONIC MAIL

The electronic mail feature allows users to communicate individually with each other via computer over the network. With regard to incoming E-mail, a user can read it, send a reply, forward, save and/or print. There are also several options for outgoing E-mail: send, resend, reread, rewrite, retract, delete. With the Director working in a remote office the center does a large part of day-to-day communication with him via E-mail. Delivery of a mail message can be delayed and/or prioritized. It is also possible to determine whether a message sent to another person has been opened. An additional option is to keep an outgoing message in one's own box until all recipients of the message have deleted it in their respective boxes. Through the use of E-mail, much of the work a secretary would do in a more traditional office is eliminated or simplified.

ELECTRONIC CALENDERING

The electronic calendar provides an easy way to determine who is **available** when. The calendar has space for schedules, memos and personal reminders. Appointments can be prioritized. Suppose an employee wants to schedule an appointment with someone else in the office. Via the computer, a user can look at the other person's calendar and find an empty slot to enter a tentative appointment. The other person can then **confirm**, cancel, or reschedule the appointment without the hassle of calling over the phone and playing phone tag to get an appointment. The computer can also be programmed to give out an alarm at a pre-set time (for example, a few

minutes before the appointment).

All users in the Research Center have access to the electronic Calendar as part of WordPerfect Office. The administrative secretary has the schedules of the Director and Assistant Director and makes appointments for them. They log in daily to the calendar to check for appointments. The Director's Special Assistant uses the calendar to schedule staff meetings. Other users check their electronic calendars daily to find out about these meetings. When it is necessary to reschedule, this can be accomplished silently via computer instead of interrupting the users as they go about their normal tasks.

NOTEBOOK

The Notebook is a free form database that can be used for various functions. At GCHSRC, one of the secretaries uses the Notebook as an electronic index for the Center's filing systems. The software enables a search to locate files. Notebook can also be used to store addresses in appropriate files. This process has been automated through creation of a macro, which is activated by a menu choice. For instance, one can choose employee addresses, general addresses, graduate students' addresses, industry/university contacts, etc. Through the notebook software one can create mailing labels and address lists.

OTHER SOFTWARE

Personnel of the Center use other software for individual or group purposes, some of which is off-the-shelf and some of which has been custom-developed in-house or by consultants. These programs assist in file and database management, hardware and software optimization, and generation of frequently used forms (legal documents, for example). In-house personnel have created macros in several of the software packages for commonly used tasks. One of the major customized programs is the Project Management Information System. This keeps track of the different projects that the center is conducting for various organizations. It is used by the Assistant Director, his secretary and the administrative technician who keeps track of the finances. This system is discussed in more detail below.

PROJECT MANAGEMENT INFORMATION SYSTEM

The work of the Research Center involves considerable interlinking of funds, projects, advisors, universities, and users. There is a tremendous amount of data/information coming in and going out.

PMIS is a menu-driven system designed to support the Director in collecting, storing, processing and manipulating information on research proposals and projects pertinent to the research center. It consists of the main PMIS system and two subsystems: the Financial Package and the Technology Interchange System. Each of these is described in subsequent paragraphs. The software was written using the Clipper 5.01 compiler. Installation of PMIS and its associated data on the network allows more than one person to work with it.

In the main PMIS system, new proposals are entered, monitored and tracked until they are approved or rejected. Once a project is approved and funded, it is monitored until it is completed/canceled and archived. Some projects are modified after approval, and these changes must be incorporated into the database. When questions arise concerning the status of a given project/proposal, status of a given project/proposal at a specific university, or status of projects/proposals of a certain type, the director of the research center can quickly query the database and display the appropriate information. Also, an efficient reporting system must be maintained to satisfy reporting requirements of various governing agencies. Reports are generated easily and are routed to a line printer.

In the Financial Planning System, the Director is given an opportunity to manipulate federal, state, and other funds at the university level. Options for a given university are set to facilitate the computation of fringe benefits and indirect costs. The package will then pull all proposed

projects from the database and allow the Director to manipulate the **available** funds among the proposals. When the resources have been arranged in a satisfactory manner, the approved proposals can be flagged and moved into the PMIS system as funded projects.

The Technology Interchange System is designed to track one or more technical papers that are associated with a particular project, as well as any number of presentations or publications that can be associated with each paper. Any number of authors can also be credited for each paper.

USER TRAINING

A minimum level of training is required for the office personnel who will be participating in the LAN. This training is conducted by the office System Administrator and co-workers. When a new employee starts work, the System Administrator provides approximately 2 hours of instruction on the LAN, the WordPerfect Office program used for e-mail, simple database functions, PC interfacing with the LAN file server, and other LAN resources. Additional on-the-job training is provided by co-workers or the System Administrator as needed. One result of this on-the-job training is that some of the LAN participants have developed an in-depth knowledge of several WordPerfect Office subprograms to increase their job effectiveness.

The Center's Assistant Director, who acts as the LAN System Administrator, attended a Novell certified System Administrator short course and receives on-the-job training from the University network engineer. He also subscribes to a Novell Netware newsletter to keep abreast of the latest patches and fixes which may be needed by the system.

ALTERNATIVE APPROACHES

We first considered a peer-to-peer LAN which had administration and mail capabilities. The biggest advantage that peer-to-peer LANs offer is ease of use and quick installation. We found that most systems of that type required a Windows environment which we did not have. Ease of use is not the only benefit of peer-to-peer LANs. They also share CD-ROM drives and printers as well as server-based systems. The lack of sophisticated management tools makes peer-to-peer systems easier to use in small networks, but less appropriate for large networks. Reporting on the activities of users or status of resources is weak. Network security is another important yet weak area in peer-to-peer networks. Most peer-to-peer networks have security features that consist of nothing more than assigning a password to the directory and subdirectories of a hard disk. Although our beginning network consisted of only 6 nodes, we felt the number of users would grow considerably over time. This fact, coupled with our desire for strong administrative reporting and security support, were the most significant factors in our choosing a server-based LAN.

IMPLEMENTATION PROBLEMS

We chose a standard twisted-pair Ethernet wiring scheme for our network. The three main cabling schemes for Ethernet that we studied included thick Ethernet, thin Ethernet, and twisted pair. We found that twisted-pair wiring typically is used when you want a central network-control area with all systems independently wired from that point. An important criteria in this choice was that we felt that we might frequently add or remove single computers from the network and the integrity of the network would not be disturbed.

This caused some problems in that our LAN was only the second such network installed on our campus. The Telecommunications Department was still learning. We also learned the hard way that shielding our cables was important as the cleaning crew caused our network to crash while cleaning the building. Our original installation required a bridge between our LAN and the university fibre optic network for communication with Internet. Only one bridge was **available** for this purpose on our campus but was in use in another building. We had to wait several months to install it.

Most of the staff employed at the Center had no experience with networks

and had to be trained before they could use it. This caused a delay of several days. Our network manager was also a novice to networks and eventually went to a management training seminar.

COSTS

The initial hardware cost of our LAN was approximately \$4,300 and included the purchase and installation of an i80386/SX processor as file-server, Ethernet cards for each PC, and a Laser printer. We already owned the 6 PC's that formed the original network. Cabling was not a factor because our Telecommunications Department furnished and installed it. Software costs amounted to \$1,500 for an ELS-II system. We have since upgraded this to the Novell Netware 3.1.1 system. Training costs for the network manager were \$800. Most of our PC's, including the server, have been upgraded to the i80486/DX class.

USER SATISFACTION WITH LAN

The users of the network at the Research Center are unanimous in their support of the system and the way in which it enhances their day-to-day work. Ease of use was one of the advantages cited.

One of the favorite features is the communication capability through E-mail and electronic calendaring. Even though the office is small enough so that verbal communication is easy, users see advantages to electronic communication. Communicators may stay at their work stations as they deliver and receive messages. Someone who is temporarily out of the office can still be sent a message. Further, work is not interrupted as it would be by someone delivering a verbal message. Even if a message is delivered verbally, the electronic communication of the same message provides confirmation and a written (or beep) reminder.

Users also appreciate the data-sharing aspects of the network. Data can be organized in such a way that it is useful in several applications to different users. Users have become proficient at swapping data among software packages. With the network, users get a broad picture of the entire Center's operations, not just a view of what their particular workstation is doing.

Without the network, the work would proceed more slowly and more employees would be needed. There would be more paperwork and more files to secure and maintain.

DISADVANTAGES OF THE LAN

The primary disadvantage with the network at the Center is that, because all data is stored on the file server, little if any work can be done when the network is down. Hardcopy printouts are kept of all data, but this is done as a protective measure rather than to provide an alternative work environment.

Another disadvantage of the existing setup is that with some software, there is a beeping when a message is delivered through E-mail, even though the user may be involved in word processing or a spreadsheet application. Sometimes the computer starts to beep continuously and the only way to stop the beeping is to get completely out of the application package and get back into the system. This particular problem will be solved when the system is upgraded.

One of the advantages cited was the ease of communication between users. There is another side to this: the lack of interpersonal communication and the necessity of waiting for a response. Another drawback is that if there is a glitch in the system, one's message may not go where it is supposed to go.

FUTURE PLANS

The Research Center has continued to grow in its client/researcher base and

in the services it is able to offer. Recently, the Center acquired the adjacent building (formerly a fraternity house) and plans to extend the LAN to that building. The network operating system will be upgraded with a new version, overcoming some of the problems that exist currently. More hard disk space is planned for the file server.

Several of the network files serve as an address base for potential seminar participants (a source of revenue for the Center). A sophisticated mailing list management package has been purchased, and addresses are being arranged into the proper format for mailouts. Generation of postal barcodes and presorting will reduce postage costs. The network will allow these addresses to be accessed by several users and multiple applications.

As experience with the network environment increases, fewer operating errors will occur. It is anticipated that users will continue to feel enthusiastic about using the network. Lessons that have been learned in the small workgroup can be extended to a larger setting as the Center grows.

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Carolyn R. Harris, Ph.D. is associate professor in the Division of Business Administration at Midwestern State University in Wichita Falls, TX. Her research interests include human factors information systems, and she is currently forming a student chapter of ASM at Midwestern State University. Donald L. Jordan, Ph.D. is an associate professor in the Administrative Services Department at the College of Business, Lamar University in Beaumont, TX. He is a member of ACM and is currently involved in developing large software systems and performing software engineering research.

Thomas J. Pinson III is assistant director of GCHSRC. He has administrative responsibility for all research efforts at the Center.

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Internet-Friendly PIMs

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The latest generation of Personal Information Managers (PIMs) is helping users stay connected and up-to-date by focusing on software integration and maximizing Internet functionality.

Though Lotus Organizer is already a fairly mature product, Lotus Development Corp. (800-346-1305, www.lotus.com) is updating its popular PIM with the release of Lotus Organizer 5.0 (\$80 street). Enhancements include new weekly time slots and day planner views, Timed Tasks and Calls, and print preview. Also new is support for the iCalendar standard, which allows you to **schedule appointments** and share your **calendar** over the **Internet** with other users that have PIMs that support iCalendar. Other new features: LDAP lookup, support for various Internet file formats, including vCard and vCalendar, and live URL links in the Organizer notepad. EasyClip text entry simplifies copying data from any Windows program into Organizer. Road warriors in particular will appreciate the integration with the Official Airline Guide Travel Information System.

The forthcoming release of Microsoft Corp.'s Microsoft Outlook 2000 (425-882-8080, www.microsoft.com) constitutes a major upgrade of Microsoft's PIM/messaging client. Currently in beta and due in early 1999 (pricing not yet determined), Outlook conveniently integrates e-mail messaging with calendaring, thereby making scheduling and maintaining contact information a breeze.

Outlook 2000 also supports LDAP, vCard, and iCalendar. It offers such new features as the Meeting Planner, which allows you to select attendees and search for **available** times, and the ability to publish your calendar on the Web. Flag and Follow-up helps you prioritize messages and contacts, and the Message Recall feature allows you to cancel or replace a message previously sent to other Outlook users, provided they haven't already checked that message.

MARK THE DATE: Lotus Organizer 5.0 offers a convenient new user interface.

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COMPARED

Lotus solution

Lotus Domino 4.5 server

Lotus Notes 4.5 client

Lotus Development Corp.

Microsoft solution

Microsoft Exchange Server 5.0

Microsoft Corp.

Novell solution

GroupWise 5 InForms 4.1

Novell Inc.

In a past Comparison of Internet-based groupware applications, Lotus Notes emerged as a prodigy. This time around, Microsoft's and Novell's solutions have matured, but Lotus' remains the virtuoso.

Last December we explored the Internet-based groupware applications of Lotus, Microsoft, and Netscape in a Comparison that coined these products as "intraWare." (See "Intranets meet groupware," Dec. 9, 1996, page 1.) These intraWare solutions were the first to combine e-mail, conferencing, document management, workflow, and group scheduling with the power and flexibility of the World Wide Web. Although we were mightily impressed by the ingenuity of these products, we found the usual flaws and areas for improvement that the vendors promised to address in the next releases.

In this Comparison, we tested Lotus Domino 4.5 server and Lotus Notes 4.5 client, Microsoft Exchange Server 5.0, and GroupWise 5, taking a slightly different approach to testing this time around. Instead of simply comparing the products with each other, we also compared the latest version to the past version -- assuming that most sites have already installed groupware, we want to tell you if it makes sense to upgrade, switch to a new product, or keep what you have.

Previously, we concocted a battle between Lotus Notes, Release 4.1; Microsoft Exchange Server 4.0; and Netscape's SuiteSpot. Notes emerged victorious by a small margin, but it was clear that the competition was moving in and Lotus had no time to rest on its laurels.

Why didn't we include the new version of SuiteSpot? We really wanted to. But unfortunately, we can't dictate the release of products, and our testing schedule missed the debut of Netscape's SuiteSpot 3.0 and the Communicator client (the successor to Netscape Navigator 2.02) by just a few weeks. We'll cover the Netscape solution in a Comparison Update soon. Instead, we chose to round out our Comparison with GroupWise 5, a new contestant in the intraWare arena.

DRESS REHEARSAL. Once we got our hands on all the products, we took to the lab. Our main objective was to put ourselves in the shoes of an IS manager deciding whether the added features of these products were worth subtracting dollars from the annual budget.

We were struck by how easy it was to install the software, but we hit a few snags when it came to configuration and spent some time on the phone

with technical support asking questions. As a result, we learned one important lesson: The more knowledgeable you are about your operating system, the easier it will be to configure the software.

The bulk of our time was spent looking at the collaboration features -- the features that let you work and communicate with other people electronically. All of the products now offer integrated calendar and scheduling functions. This advancement makes it easier to plan a meeting or collaborate with a team because you can see all of your co-workers' schedules.

We spent some time looking at the different access routes, both from the desktop and from a remote location. The most remarkable thing about these solutions is that you can now access the application through a Web browser -- which gives you an even stronger argument for working at home. The Novell and Lotus solutions give you full capabilities from a Web browser, whereas the Microsoft solution left out the calendar and task-management features. Never to be outdone, Microsoft has promised those for a future release.

We also explored the remote-access options -- the capabilities for downloading files or downloading portions of the mailbox from the server and working offline from an airplane or a hotel room. Using the remote client to access the network avoids the connection charges that accrue with a Web browser.

Most people will want to customize their application in some way, either by building simple workflow structures or by completely redesigning the interface. Fortunately, the vendors have come a long way in easing the process. We looked at how end-users could complete simple tasks, such as building forms, and what tools were **available** to application developers for more complex alterations.

ENCORE! The vendors are getting close to offering all of the features people expect from an intraware solution. Still, Lotus and Microsoft would benefit from implementing document version control, Novell will need to come up with a better way to build a workflow, and all three should pay closer attention to the client interface. But in this business, as long as people keep coming up with new ideas, there will never be a perfect product.

Lotus solution

The components

* Lotus Domino 4.5 server * Lotus Notes 4.5 client

Lotus continues to upgrade its groupware product to make it easier to use, and this release is no exception. If you're already using Lotus Notes 4.1, we recommend upgrading to Lotus Domino 4.5 server and Lotus Notes 4.5 client for reasons that benefit both administrators and end-users.

The application now integrates with Windows NT, which is a big improvement for connecting with existing environments and creating users. The Notes client is also the only client in the Comparison to provide the same capabilities in both 32-bit and 16-bit environments, which means that it's not necessary to upgrade your client OS to accommodate the new release. You also won't have to load a separate date-book program on the desktop because the upgrade integrates calendar and scheduling features into the main application. Domino lets you access Notes through the World Wide Web, which is a great benefit to employees who travel frequently or work from home.

Domino's basic installation procedure hasn't changed from the last version, but it still lacks a seamless way to import NetWare users. Configuring the server for SMTP/MIME is cumbersome because there are no wizards or guides to walk you through the process. We also ran into problems configuring the server for Internet access from a Web browser because the DNS didn't understand the Domino server's naming convention. However, the remote-access configuration is done for you automatically.

The ability to work from your Web browser is a great benefit of this version. You can send and receive e-mail, view your **calendar**, and **schedule** meetings, **appointments**, or tasks from your **Web** browser. However, you have to download new Web mail templates from Lotus' Web site to give remote users a full range of capabilities. Without the templates, you only have the ability to view the databases. In future releases, Domino will ship with Web mail templates, but for now they are only **available** from the Web site.

The remote-access client has not changed with this version, and it

still provides users with all the functions of the desktop client. Our only complaint is that the replication process took a little too long.

Lotus also provides you with the Personal Web Navigator for searching the Web and storing favorite sites in a common database. We found this to be handy when several people were doing research on the Web from different locations, because it's easy to keep track of the sites co-workers have already visited.

The Lotus solution lets you control user's Web access, provided they surf using the Personal Web Navigator. You can selectively give users access to and from the Web and monitor the sites they visit. Even if you're not concerned about your employees playing on the Web, you might want to avoid bogging down the connection at crucial times.

The integration of Lotus Organizer personal information manager's calendar and scheduling features into the latest version of Notes is one of the best reasons for upgrading. The scheduling feature lets you find free time for meetings and other resources, such as conference rooms or equipment. When you request a meeting, an e-mail is sent to those users who are invited, and they can choose to accept, decline, delegate, or suggest an alternate time. If you have something already scheduled for the suggested time frame, the application sends a warning that you have a conflict and asks for a confirmation. The calendar and scheduling code is **available** to developers so they can add this feature into other Notes applications.

Notes' stellar searching capability is maintained in this version. You can search for words and phrases inside document attachments or across folders and databases using Boolean or simple character searches.

The Lotus solution also includes a lot of sample template databases and forms that you can modify to create customized workflows, but there are few easy-to-use wizards or helpers to make developing applications straightforward. The applications we developed in Notes with Windows 95 ran on Mac and Windows 3.1 platforms.

We liked the ease with which we could create a link to the Web. By simply typing the URL, Notes recognizes and underlines the site as a link. URLs can be launched from within messages, from a menu item, or from the Personal Web Navigator. You can also embed a live Web page into a message, and the page will maintain its links.

Despite these improvements, the Lotus solution has room to grow. Domino still doesn't have a document check-in and check-out facility, so if two or more people try to save changes to the same file, they will get replication conflicts. However, Lotus recently announced a Domino add-on called Domino.Docs that will do revision control and document management. It will ship at the end of the second quarter, priced at \$4,275.

Domino lets you view or launch a variety of document types, even if you don't have the associated application loaded on your system. However, we couldn't find a way to view attachments directly in the browser; we had to download and view them using the associated application.

You can view OLE objects on any client, but you can only open and edit them on clients that house an application that can handle the OLE object.

We liked the agents for processing mail and automating other tasks, but we wish Lotus provided more wizards or other helpers to make creating the agents easy.

Microsoft solution

The components

* Microsoft Exchange Server 5.0

Microsoft has made several strides with Exchange to make electronic group collaboration a reality. However, some issues, such as the server's dependence on Microsoft products for operation, still need to be addressed. You must be running Windows 95 or Windows NT 4.0 on the desktop if you want to take advantage of the Outlook 97 client. And if you are a NetWare shop, you have to install Windows NT into the NetWare environment.

If you're already running Exchange 4.0 on Macintosh or Windows 3.1, plan on upgrading your OS or don't bother to upgrade the application. The package comes with an Exchange client for Mac and Windows 3.1, but it suffers from having the inbox and public-folders list in one view with a separate application -- Microsoft Schedule+ -- for the calendar, task management, and scheduling functions.

For those already humming along with the latest Microsoft technology, the new version of Exchange will give you lots to cheer about. The Outlook

97 client is a great addition, providing users with a smart interface that runs circles around the old client. Wizards have been introduced that make the application pleasantly easy to set up, and the SMTP gateway and Network News Transfer Protocol service are extremely well-integrated and easy to configure. We also noticed a slight improvement in speed over the last version, which was woefully slow.

Installing and configuring Exchange is a breeze. Enhancements such as the Internet Mail wizard make it much easier to set up and send messages across the Internet. The other solutions require more manual configuration and expertise behind the scenes.

Exchange can only run on an NT server and requires Microsoft's Internet Information Server and Active Server Pages, which are included in NT, for Web integration. You can only administer Exchange from an NT server or workstation; you can't administrate remotely or from a Web browser like you can with the Lotus solution. However, Exchange does provide a clean interface for importing both Windows NT and NetWare users.

Exchange offers the same monitoring tools as the previous versions through the NT performance monitors, which are a function of NT.

Outlook offers some big automation improvements, such as automatic e-mail response, integrated forms creation, and contact management. You can easily schedule message delivery and enable the Voting Buttons feature, which lets you respond to a message by simply clicking on one of the quick-response buttons. You also can set an expiration date for a message and request a delivery and return receipt from a tab right on your mail message.

Outlook offers customizable views that represent each of the groupware functions, such as e-mail, schedule, or contacts. You can sort, group, and filter any of the items within the views by different criteria. For instance, you can pull up all messages from one e-mail address or arrange your activities in order of importance.

Microsoft continues to use public folders to store documents and other data, as well as to conduct discussions. There are no document-management capabilities, such as a formal document store or check-in and check-out process.

The remote-access viewer for both Outlook and Exchange is easy to use and provides all the capabilities of the desktop clients. The Outlook remote client relies on Microsoft's Remote Access Server, and the Exchange remote client ships with Shiva's ShivaRemote for dial-up access.

Exchange lets you send an e-mail containing a URL, but you can't embed a Web page in an e-mail message, as you can with Notes. You also can search the entire contents of Outlook to look for occurrences of a word or phrase.

Microsoft has done a good job of integrating Web access into the server side, but it hasn't provided enough of the capabilities of the standard Exchange client or the Outlook client. The Active Server Pages that ship with the product only give you the ability to send mail and see the public folders via the Web; you can't see the calendar or assign and work on tasks. However, the Web client interface looks exactly like an Outlook client, which should reduce the amount of end-user training.

Outlook offers a variety of forms that give developers greater flexibility for building custom applications. Like their Forms Designer predecessors, the Outlook forms are still easy to create, yet they've been further improved to let you build more complicated workflows within the confines of the client. But you must be running the Outlook client to benefit from the Outlook forms.

Novell solution

The components

* GroupWise 5 * InForms 4.1

We were impressed with the performance of the Novell solution in most testing categories; however, the application does not offer a built-in forms designer or other workflow features. Instead, you have to rely on InForms, which doesn't integrate well with the GroupWise server. Novell has plans to release a new version of GroupWise Workflow in June that will work with the GroupWise server to enable users to create routing forms and track the status of a project. Until this happens, we don't recommend that you upgrade.

If you're looking for a groupware product to implement now, Novell's latest offering is still a good choice for those who are currently invested in NetWare. The biggest administration improvement is its complete

integration with NetWare. With this integration, all the administration now takes place under the NetWare Administration utility instead of a separate program. This single-point administration is a huge improvement over the last version and is something that the other programs fail to offer, but you'll need to have someone on staff with a complete understanding of NetWare 4.1.

The Novell solution requires a NetWare server to run, but Novell was kind enough to include a run-time version in the box. Adding the application to the server is a simple task, but setting up gateways is more grueling than necessary because the documentation leaves out pertinent information to guide you. Be prepared to spend some time on the phone with technical support -- we did.

As with older versions of GroupWise, NetWare users can be imported or manually created from each individual user with this solution. Unlike the other solutions in this Comparison, GroupWise had no options for directly importing Windows NT users.

Web access is automatically granted to all users, but administrators have fewer options for restricting Web access than with the other solutions. Whatever networking restrictions you can set through NetWare will also apply to the GroupWise server.

Novell has updated the GroupWise client interface to a three-pane view that is similar to Notes and Exchange. The updated version offers a 32-bit client for Windows 95, a new 16-bit client for Windows 3.x, and a Web client that can be accessed by most browsers. GroupWise offers similar capabilities on 16-bit and 32-bit platforms, except you can't manage documents with the 16-bit version.

GroupWise integrates with many desktop applications and offers support for a wide range of file types. It also has convenient options to have mail messages forwarded to a phone or pager number.

GroupWise WebAccess lets you access most of the features of the Windows client through the World Wide Web. You can log on, check your e-mail, assign tasks, and schedule appointments without problems.

Users will also appreciate the calendar and scheduling features and document-management capabilities. All of the features are now located in one view, which means you can easily switch between the calendar and your inbox without opening and closing windows. We liked the clarity of the calendar views, which display appointments and tasks, although the ability to change the scale (displayed in days, weeks, or months) directly from the calendar view would be a welcome improvement. Instead, you have to delve into the preferences dialog boxes to change the view, which took us a while to figure out.

In addition to shared folders, the Novell solution offers a smart document management system that lets users check documents in and out and create a version list, even from a remote location.

With this version, Novell fixed a problem with meeting invitations that occurred in GroupWise 4.1. Before, your name wasn't automatically included if you sent an invitation to a group; you had to manually add your name. Now, the sender is automatically listed at the top. You also can schedule conference rooms and other resources, as long as the administrator creates them as GroupWise objects in the Novell Directory Services.

Setting up the remote access was not as straightforward as we would have liked. We struggled with it until Novell's technical support showed us a kludgy way to start the remote client. The remote access client gives you access to all the features and offers you replication options for downloading entire files or only the sections you need.

As with the Lotus solution, users have easy access to URLs from within the GroupWise client: Doubling clicking on a URL will launch the installed browser.

You have to use InForms to design and route electronic forms and collect data. Although we liked InForms as a stand-alone product, it doesn't integrate well with the latest version of GroupWise because it is made for GroupWise 4.1. For example, when we installed InForms after installing the GroupWise client under Windows 95, InForms only found Messaging API (MAPI) as a mail transport. Therefore, when we sent forms via mail, the system utilized MAPI instead of the GroupWise mail transport. And because we had to rely on the meager set of tools provided by InForms, we couldn't find a way to enhance a form by inserting an OLE object, such as a Microsoft Word document. Further, we couldn't view our forms over the Web.

On the bright side, InForms is ODBC-compliant.

Report Card Intraware solutions

Lotus solution Lotus Domino 4.5 server Lotus Notes 4.5 client Lotus Development Corp. Cambridge, Mass. (800) 346-1305; (617) 577-8500
<http://www.lotus.com>

(Weighting)

Performance:

Implementation (10%) Good 0.6 The Domino server has no seamless options for importing NetWare users. We had difficulty configuring some options, such as the SMTP and MIME gateways. Domino offers a wide range of platform support, integrates with Windows NT and common desktop applications, and supports most browsers.

Administration (15%) Very Good 1.2 The Lotus solution has more flexible administration options than the others, but its lack of wizards kept it from receiving a higher score. You can administer the system from many locations, including a Web browser. Domino offers quality administration tools for setting alerts and provides strong security with encryption keys. Administrators can place limits on the Web sites that users visit.

Collaboration (20%) Very Good 1.6 The Lotus solution handles most collaboration tasks with ease. The calendar and scheduling features offer flexibility and are well-integrated with e-mail. There is no schedule viewer, as there is in Exchange and GroupWise. Instead, you have to start a new meeting template, add users, then check their schedules. You can easily search across databases for keywords and phrases.

Accessibility (15%) Very Good 1.2 You can access the Lotus solution from the desktop, the World Wide Web, or a remote client; all paths offer similar functions. Notes has a built-in Web browser, the Personal Web Navigator, that lets you search the Web and store sites in a shared database. It is the only solution that provides the same interface across all platforms and lets you embed a Web page in a message.

Automation (15%) Very Good 1.2 The Lotus solution is highly customizable, but developing applications is difficult. Lotus provides sample databases and forms in the box. The agents used to process incoming mail are powerful but difficult to set up. Notes, like Exchange, lets you develop views and templates for the Web.

Support and price:

Documentation (5%) Satisfactory 0.2 Lotus' hard-copy documentation is detailed, with a thorough guide to application development, but the online help is frustrating and useless.

Technical support (5%) Very Good 0.4 Lotus' technical support staff is pleasant and answered most of our questions quickly.

Support policies (5%) Good 0.3 Lotus offers 30 days of free technical support weekdays from 8 a.m. to 8 p.m. Eastern time. You also get a 60-day money-back guarantee and support via the Web, e-mail, and fax.

Cost of ownership (10%) Good 0.6 The average cost of the Lotus solution is \$34,690 for 500 users.

Final score 7.3

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Internet-Friendly PIMs

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The latest generation of Personal Information Managers (PIMs) is helping users stay connected and up-to-date by focusing on software integration and maximizing Internet functionality.

Though Lotus Organizer is already a fairly mature product, Lotus Development Corp. (800-346-1305, www.lotus.com) is updating its popular PIM with the release of Lotus Organizer 5.0 (\$80 street). Enhancements include new weekly time slots and day planner views, Timed Tasks and Calls, and print preview. Also new is support for the iCalendar standard, which allows you to **schedule** ~~appointments~~ and share your **calendar** over the **Internet** with other users that have PIMs that support iCalendar. Other new features: LDAP lookup, support for various Internet file formats, including vCard and vCalendar, and live URL links in the Organizer notepad. EasyClip text entry simplifies copying data from any Windows program into Organizer. Road warriors in particular will appreciate the integration with the Official Airline Guide Travel Information System.

The forthcoming release of Microsoft Corp.'s Microsoft Outlook 2000 (425-882-8080, www.microsoft.com) constitutes a major upgrade of Microsoft's PIM/messaging client. Currently in beta and due in early 1999 (pricing not yet determined), Outlook conveniently integrates e-mail messaging with calendaring, thereby making scheduling and maintaining contact information a breeze.

Outlook 2000 also supports LDAP, vCard, and iCalendar. It offers such new features as the Meeting Planner, which allows you to select attendees and search for **available** times, and the ability to publish your calendar on the Web. Flag and Follow-up helps you prioritize messages and contacts, and the Message Recall feature allows you to cancel or replace a message previously sent to other Outlook users, provided they haven't already checked that message.

MARK THE DATE: Lotus Organizer 5.0 offers a convenient new user interface.

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Small-sized LAN support for a research center

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ABSTRACT: The Gulf Coast Hazardous Substance Research Center's (GCHSRC) local area network (LAN) consists of 7 user workstations, a network server, and 3 printers in an IBM-compatible environment supported by Novell Netware. Users can be assigned 3 levels of responsibility on the LAN: 1. regular network users, 2. operators, and 3. network supervisors. GCHSRC uses WordPerfect Office LAN as its electronic messaging system. This provides communications capabilities to all network users, including electronic mail, electronic calendaring, and a notebook. The custom-built Project Management Information System is a menu-driven system designed to support the Director in collecting, storing, processing, and manipulating information on research proposals and projects. Issues relating to user training, alternative approaches, implementation problems, costs, user satisfaction, disadvantages of the LAN, and future plans are also discussed.

TEXT: Local Area Networks (LANs) are widely used to facilitate the sharing of hardware, software, and data, as well as to provide a means of communication among members of a workgroup.

The LAN discussed in this paper belongs to the Gulf Coast Hazardous Substance Research Center (GCH SRC), a consortium of Gulf Coast universities headquartered at Lamar University--Beaumont, Texas. The Center is funded by federal, state and private industry grants, has an annual budget of more than \$3 million, and is in a growth mode.

Research done through the Center is concentrated in the areas of Waste Minimization and Treatment Technology development. Research is done by the faculties of the member universities on their campuses. Proposals for research projects within the framework of the Center's program are submitted for review by the Science and Industrial Advisory Committees. These committees advise the Center Director on the technical and scientific quality of the proposals and assist him in selecting the projects which will make up the program.

INITIAL SETUP

The Research Center was originally established in a single office with a director and a secretary. The first computerized communications in the Center were between the Director and the secretary using a product called Desklink, which enabled the Director to send messages and commands. Through the use of modems and a phone line, Desklink allowed one computer to access the hard drive of another. In this implementation, it was necessary for the Director to tell the secretary what each file was called on his computer so she could then bring it up on her hard drive.

GROWTH OF THE CENTER

Later, when the Center had grown to a size requiring larger quarters, the move to a new site was thought an ideal time to set up a Local Area Network. Communication and sharing of large amounts of data have played important roles in the Center since its beginning. Additionally, the traditional advantages of a LAN such as sharing of peripherals were deemed beneficial.

A computer consultant (a faculty member at the Center's home university) and the Center's Assistant Director were primarily responsible for planning and implementing the LAN. They chose an IBM-compatible environment

supported by Novell Netware.
CONFIGURATION & MECHANICS OF THE GCHSRC'S LAN

At present, the Research Center's LAN consists of seven user workstations (PCs), a network server and 3 printers. The network server serves primarily as a data store, with some data **available** to all, and other data stored in individual subdirectories. Most of the software used in the network is installed on the individual workstations rather than on the network server.

Each of the workstations can be used in a stand-alone manner but is also able to access shared storage and output devices. There are some programs common to all the workstations (for example, those provided by the electronic messaging system). Other software may be on some PCs but not on others. Each user has the freedom to structure his or her menu in the way which is individually preferred.

PERSONNEL

The original Director of the Center has assumed a semi-retired status and has moved out of the state. His duties include establishing broad guidelines for focus and operation of the Center, but he is not overly involved with day-to-day operation. He communicates with the Center via the network, logging on through a modem. A dialogue screen allows online "conversation" with the Assistant Director. Other options include accessing his electronic calendar and E-mail. Frequently, he may find an E-Mail message regarding a document (file) requiring his attention. This file can be transferred via modem, reviewed/revised, and transmitted back to the Center. Generally, the Director communicates daily with the Center. The capabilities of the network allow him to still be involved with the operation of the Center even though he is geographically removed.

The Assistant Director tends to day-to-day management tasks and also serves as the Network Systems Administrator. He is in charge of data/files, training and network users. He uses the E-mail facility extensively to communicate with staff members regarding assignments. For example, he may type a draft of a letter, save it in a particular subdirectory on the network server, and send a message to the secretary telling her where/how to retrieve the letter for editing and printing.

Additional personnel include:

1) An Administrative Technician who tracks payroll, purchasing and other accounts of the Center with the help of the Network. She uses Form Filler (from BLOC Corporation) to generate such items as purchase requisitions, travel vouchers, employee forms and personnel reports. This program is not loaded on every user's network. Additionally, she uses a spreadsheet program, the custom-built Project Management Information System (PMIS), and some word processing. All of her programs are on the network because she shares input/output extensively with the Assistant Director. A strong advantage of using the LAN for her work is that she is charged with making changes to the PMIS, which is accessed frequently by others. By having the file only on the network (other than the backup copy), changes can be made to that copy with the assurance that all users have access to current rather than outdated information.

2) An Administrative Secretary who uses the Network programs to keep track of the Center's clients and to manage mailouts. She uses the **electronic calendar** extensively to **schedule** and maintain awareness of **appointments** for the Director and Assistant Director. In addition, she has a variety of office automation software (some off the shelf and some developed in-house) to suit her individual needs. She also supervises other clerical personnel working with mailing lists for the extensive collection of clients, researchers, and other contacts.

3) A Special Assistant to the Director who uses the Network to organize all the publications resulting from research conducted with funds from the Center and to keep track of all researchers and their work. All publications resulting from research sponsored by the Center are sent to

the GCHSRC, where they are cataloged and installed into a database. Thereafter anyone desiring the publications can access them through the network, via modem if needed.

4) Other Clerical Personnel, full-time and part-time.

NETWORK USERS AND INFORMATION PROTECTION

To use the files on the network, or access the network, a person must have the appropriate hardware and software and be designated as a network user. Users can be assigned three levels of responsibility on the network-

- * regular network users,
- * operators and
- * network supervisors.

Regular network users can run applications and work with files according to the rights assigned to them. Operators are regular network users who have been assigned additional privileges. Network supervisors are responsible for the smooth operation of the network, restructuring, and updating when needed.

All data files on the network are stored at a central location--the network server's hard disk. However, all users are not given access to all the data. Users also cannot access a data file simultaneously while in the update mode, to prevent overwriting of each other's work. They can simultaneously access a data file while in the query mode.

There is an extensive security system to protect the data on the network. It consists of a combination of passwords and trustee rights assigned to the user and the attributes assigned to directories and files. It is also possible to restrict when and how users can work on the network.

MESSAGING SOFTWARE

GCHSRC uses WordPerfect Office LAN as its electronic messaging system. This provides certain communication capabilities to all network users, including electronic mail, electronic calendaring, and a notebook. There are six levels of security and messages can be encrypted. Users access the various functions via menu.

ELECTRONIC MAIL

The electronic mail feature allows users to communicate individually with each other via computer over the network. With regard to incoming E-mail, a user can read it, send a reply, forward, save and/or print. There are also several options for outgoing E-mail: send, resend, reread, rewrite, retract, delete. With the Director working in a remote office the center does a large part of day-to-day communication with him via E-mail. Delivery of a mail message can be delayed and/or prioritized. It is also possible to determine whether a message sent to another person has been opened. An additional option is to keep an outgoing message in one's own box until all recipients of the message have deleted it in their respective boxes. Through the use of E-mail, much of the work a secretary would do in a more traditional office is eliminated or simplified.

ELECTRONIC CALENDERING

The electronic calendar provides an easy way to determine who is **available** when. The calendar has space for schedules, memos and personal reminders. Appointments can be prioritized. Suppose an employee wants to schedule an appointment with someone else in the office. Via the computer, a user can look at the other person's calendar and find an empty slot to enter a tentative appointment. The other person can then **confirm**, cancel, or reschedule the appointment without the hassle of calling over the phone and playing phone tag to get an appointment. The computer can also be programmed to give out an alarm at a pre-set time (for example, a few

minutes before the appointment).

All users in the Research Center have access to the electronic Calendar as part of WordPerfect Office. The administrative secretary has the schedules of the Director and Assistant Director and makes appointments for them. They log in daily to the calendar to check for appointments. The Director's Special Assistant uses the calendar to schedule staff meetings. Other users check their electronic calendars daily to find out about these meetings. When it is necessary to reschedule, this can be accomplished silently via computer instead of interrupting the users as they go about their normal tasks.

NOTEBOOK

The Notebook is a free form database that can be used for various functions. At GCHSRC, one of the secretaries uses the Notebook as an electronic index for the Center's filing systems. The software enables a search to locate files. Notebook can also be used to store addresses in appropriate files. This process has been automated through creation of a macro, which is activated by a menu choice. For instance, one can choose employee addresses, general addresses, graduate students' addresses, industry/university contacts, etc. Through the notebook software one can create mailing labels and address lists.

OTHER SOFTWARE

Personnel of the Center use other software for individual or group purposes, some of which is off-the-shelf and some of which has been custom-developed in-house or by consultants. These programs assist in file and database management, hardware and software optimization, and generation of frequently used forms (legal documents, for example). In-house personnel have created macros in several of the software packages for commonly used tasks. One of the major customized programs is the Project Management Information System. This keeps track of the different projects that the center is conducting for various organizations. It is used by the Assistant Director, his secretary and the administrative technician who keeps track of the finances. This system is discussed in more detail below.

PROJECT MANAGEMENT INFORMATION SYSTEM

The work of the Research Center involves considerable interlinking of funds, projects, advisors, universities, and users. There is a tremendous amount of data/information coming in and going out.

PMIS is a menu-driven system designed to support the Director in collecting, storing, processing and manipulating information on research proposals and projects pertinent to the research center. It consists of the main PMIS system and two subsystems: the Financial Package and the Technology Interchange System. Each of these is described in subsequent paragraphs. The software was written using the Clipper 5.01 compiler. Installation of PMIS and its associated data on the network allows more than one person to work with it.

In the main PMIS system, new proposals are entered, monitored and tracked until they are approved or rejected. Once a project is approved and funded, it is monitored until it is completed/canceled and archived. Some projects are modified after approval, and these changes must be incorporated into the database. When questions arise concerning the status of a given project/proposal, status of a given project/proposal at a specific university, or status of projects/proposals of a certain type, the director of the research center can quickly query the database and display the appropriate information. Also, an efficient reporting system must be maintained to satisfy reporting requirements of various governing agencies. Reports are generated easily and are routed to a line printer.

In the Financial Planning System, the Director is given an opportunity to manipulate federal, state, and other funds at the university level. Options for a given university are set to facilitate the computation of fringe benefits and indirect costs. The package will then pull all proposed

projects from the database and allow the Director to manipulate the **available** funds among the proposals. When the resources have been arranged in a satisfactory manner, the approved proposals can be flagged and moved into the PMIS system as funded projects.

The Technology Interchange System is designed to track one or more technical papers that are associated with a particular project, as well as any number of presentations or publications that can be associated with each paper. Any number of authors can also be credited for each paper.

USER TRAINING

A minimum level of training is required for the office personnel who will be participating in the LAN. This training is conducted by the office System Administrator and co-workers. When a new employee starts work, the System Administrator provides approximately 2 hours of instruction on the LAN, the WordPerfect Office program used for e-mail, simple database functions, PC interfacing with the LAN file server, and other LAN resources. Additional on-the-job training is provided by co-workers or the System Administrator as needed. One result of this on-the-job training is that some of the LAN participants have developed an in-depth knowledge of several WordPerfect Office subprograms to increase their job effectiveness.

The Center's Assistant Director, who acts as the LAN System Administrator, attended a Novell certified System Administrator short course and receives on-the-job training from the University network engineer. He also subscribes to a Novell Netware newsletter to keep abreast of the latest patches and fixes which may be needed by the system.

ALTERNATIVE APPROACHES

We first considered a peer-to-peer LAN which had administration and mail capabilities. The biggest advantage that peer-to-peer LANs offer is ease of use and quick installation. We found that most systems of that type required a Windows environment which we did not have. Ease of use is not the only benefit of peer-to-peer LANs. They also share CD-ROM drives and printers as well as server-based systems. The lack of sophisticated management tools makes peer-to-peer systems easier to use in small networks, but less appropriate for large networks. Reporting on the activities of users or status of resources is weak. Network security is another important yet weak area in peer-to-peer networks. Most peer-to-peer networks have security features that consist of nothing more than assigning a password to the directory and subdirectories of a hard disk. Although our beginning network consisted of only 6 nodes, we felt the number of users would grow considerably over time. This fact, coupled with our desire for strong administrative reporting and security support, were the most significant factors in our choosing a server-based LAN.

IMPLEMENTATION PROBLEMS

We chose a standard twisted-pair Ethernet wiring scheme for our network. The three main cabling schemes for Ethernet that we studied included thick Ethernet, thin Ethernet, and twisted pair. We found that twisted-pair wiring typically is used when you want a central network-control area with all systems independently wired from that point. An important criteria in this choice was that we felt that we might frequently add or remove single computers from the network and the integrity of the network would not be disturbed.

This caused some problems in that our LAN was only the second such network installed on our campus. The Telecommunications Department was still learning. We also learned the hard way that shielding our cables was important as the cleaning crew caused our network to crash while cleaning the building. Our original installation required a bridge between our LAN and the university fibre optic network for communication with Internet. Only one bridge was **available** for this purpose on our campus but was in use in another building. We had to wait several months to install it.

Most of the staff employed at the Center had no experience with networks

and had to be trained before they could use it. This caused a delay of several days. Our network manager was also a novice to networks and eventually went to a management training seminar.

COSTS

The initial hardware cost of our LAN was approximately \$4,300 and included the purchase and installation of an i80386/SX processor as file-server, Ethernet cards for each PC, and a Laser printer. We already owned the 6 PC's that formed the original network. Cabling was not a factor because our Telecommunications Department furnished and installed it. Software costs amounted to \$1,500 for an ELS-II system. We have since upgraded this to the Novell Netware 3.1.1 system. Training costs for the network manager were \$800. Most of our PC's, including the server, have been upgraded to the i80486/DX class.

USER SATISFACTION WITH LAN

The users of the network at the Research Center are unanimous in their support of the system and the way in which it enhances their day-to-day work. Ease of use was one of the advantages cited.

One of the favorite features is the communication capability through E-mail and electronic calendaring. Even though the office is small enough so that verbal communication is easy, users see advantages to electronic communication. Communicators may stay at their work stations as they deliver and receive messages. Someone who is temporarily out of the office can still be sent a message. Further, work is not interrupted as it would be by someone delivering a verbal message. Even if a message is delivered verbally, the electronic communication of the same message provides confirmation and a written (or beep) reminder.

Users also appreciate the data-sharing aspects of the network. Data can be organized in such a way that it is useful in several applications to different users. Users have become proficient at swapping data among software packages. With the network, users get a broad picture of the entire Center's operations, not just a view of what their particular workstation is doing.

Without the network, the work would proceed more slowly and more employees would be needed. There would be more paperwork and more files to secure and maintain.

DISADVANTAGES OF THE LAN

The primary disadvantage with the network at the Center is that, because all data is stored on the file server, little if any work can be done when the network is down. Hardcopy printouts are kept of all data, but this is done as a protective measure rather than to provide an alternative work environment.

Another disadvantage of the existing setup is that with some software, there is a beeping when a message is delivered through E-mail, even though the user may be involved in word processing or a spreadsheet application. Sometimes the computer starts to beep continuously and the only way to stop the beeping is to get completely out of the application package and get back into the system. This particular problem will be solved when the system is upgraded.

One of the advantages cited was the ease of communication between users. There is another side to this: the lack of interpersonal communication and the necessity of waiting for a response. Another drawback is that if there is a glitch in the system, one's message may not go where it is supposed to go.

FUTURE PLANS

The Research Center has continued to grow in its client/researcher base and

in the services it is able to offer. Recently, the Center acquired the adjacent building (formerly a fraternity house) and plans to extend the LAN to that building. The network operating system will be upgraded with a new version, overcoming some of the problems that exist currently. More hard disk space is planned for the file server.

Several of the network files serve as an address base for potential seminar participants (a source of revenue for the Center). A sophisticated mailing list management package has been purchased, and addresses are being arranged into the proper format for mailouts. Generation of postal barcodes and presorting will reduce postage costs. The network will allow these addresses to be accessed by several users and multiple applications.

As experience with the network environment increases, fewer operating errors will occur. It is anticipated that users will continue to feel enthusiastic about using the network. Lessons that have been learned in the small workgroup can be extended to a larger setting as the Center grows.

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Carolyn R. Harris, Ph.D. is associate professor in the Division of Business Administration at Midwestern State University in Wichita Falls, TX. Her research interests include human factors information systems, and she is currently forming a student chapter of ASM at Midwestern State University. Donald L. Jordan, Ph.D. is an associate professor in the Administrative Services Department at the College of Business, Lamar University in Beaumont, TX. He is a member of ACM and is currently involved in developing large software systems and performing software engineering research.

Thomas J. Pinson III is assistant director of GCHSRC. He has administrative responsibility for all research efforts at the Center.

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Lotus solution

Lotus Domino 4.5 server

Lotus Notes 4.5 client

Lotus Development Corp.

Microsoft solution

Microsoft Exchange Server 5.0

Microsoft Corp.

Novell solution

GroupWise 5 InForms 4.1

Novell Inc.

In a past Comparison of Internet-based groupware applications, Lotus Notes emerged as a prodigy. This time around, Microsoft's and Novell's solutions have matured, but Lotus' remains the virtuoso.

Last December we explored the Internet-based groupware applications of Lotus, Microsoft, and Netscape in a Comparison that coined these products as "intraWare." (See "Intranets meet groupware," Dec. 9, 1996, page 1.) These intraWare solutions were the first to combine e-mail, conferencing, document management, workflow, and group scheduling with the power and flexibility of the World Wide Web. Although we were mightily impressed by the ingenuity of these products, we found the usual flaws and areas for improvement that the vendors promised to address in the next releases.

In this Comparison, we tested Lotus Domino 4.5 server and Lotus Notes 4.5 client, Microsoft Exchange Server 5.0, and GroupWise 5, taking a slightly different approach to testing this time around. Instead of simply comparing the products with each other, we also compared the latest version to the past version -- assuming that most sites have already installed groupware, we want to tell you if it makes sense to upgrade, switch to a new product, or keep what you have.

Previously, we concocted a battle between Lotus Notes, Release 4.1; Microsoft Exchange Server 4.0; and Netscape's SuiteSpot. Notes emerged victorious by a small margin, but it was clear that the competition was moving in and Lotus had no time to rest on its laurels.

Why didn't we include the new version of SuiteSpot? We really wanted to. But unfortunately, we can't dictate the release of products, and our testing schedule missed the debut of Netscape's SuiteSpot 3.0 and the Communicator client (the successor to Netscape Navigator 2.02) by just a few weeks. We'll cover the Netscape solution in a Comparison Update soon. Instead, we chose to round out our Comparison with GroupWise 5, a new contestant in the intraWare arena.

DRESS REHEARSAL. Once we got our hands on all the products, we took to the lab. Our main objective was to put ourselves in the shoes of an IS manager deciding whether the added features of these products were worth subtracting dollars from the annual budget.

We were struck by how easy it was to install the software, but we hit a few snags when it came to configuration and spent some time on the phone

with technical support asking questions. As a result, we learned one important lesson: The more knowledgeable you are about your operating system, the easier it will be to configure the software.

The bulk of our time was spent looking at the collaboration features -- the features that let you work and communicate with other people electronically. All of the products now offer integrated calendar and scheduling functions. This advancement makes it easier to plan a meeting or collaborate with a team because you can see all of your co-workers' schedules.

We spent some time looking at the different access routes, both from the desktop and from a remote location. The most remarkable thing about these solutions is that you can now access the application through a Web browser -- which gives you an even stronger argument for working at home. The Novell and Lotus solutions give you full capabilities from a Web browser, whereas the Microsoft solution left out the calendar and task-management features. Never to be outdone, Microsoft has promised those for a future release.

We also explored the remote-access options -- the capabilities for downloading files or downloading portions of the mailbox from the server and working offline from an airplane or a hotel room. Using the remote client to access the network avoids the connection charges that accrue with a Web browser.

Most people will want to customize their application in some way, either by building simple workflow structures or by completely redesigning the interface. Fortunately, the vendors have come a long way in easing the process. We looked at how end-users could complete simple tasks, such as building forms, and what tools were **available** to application developers for more complex alterations.

ENCORE! The vendors are getting close to offering all of the features people expect from an intraware solution. Still, Lotus and Microsoft would benefit from implementing document version control, Novell will need to come up with a better way to build a workflow, and all three should pay closer attention to the client interface. But in this business, as long as people keep coming up with new ideas, there will never be a perfect product.

Lotus solution

The components

* Lotus Domino 4.5 server * Lotus Notes 4.5 client

Lotus continues to upgrade its groupware product to make it easier to use, and this release is no exception. If you're already using Lotus Notes 4.1, we recommend upgrading to Lotus Domino 4.5 server and Lotus Notes 4.5 client for reasons that benefit both administrators and end-users.

The application now integrates with Windows NT, which is a big improvement for connecting with existing environments and creating users. The Notes client is also the only client in the Comparison to provide the same capabilities in both 32-bit and 16-bit environments, which means that it's not necessary to upgrade your client OS to accommodate the new release. You also won't have to load a separate date-book program on the desktop because the upgrade integrates calendar and scheduling features into the main application. Domino lets you access Notes through the World Wide Web, which is a great benefit to employees who travel frequently or work from home.

Domino's basic installation procedure hasn't changed from the last version, but it still lacks a seamless way to import NetWare users. Configuring the server for SMTP/MIME is cumbersome because there are no wizards or guides to walk you through the process. We also ran into problems configuring the server for Internet access from a Web browser because the DNS didn't understand the Domino server's naming convention. However, the remote-access configuration is done for you automatically.

The ability to work from your Web browser is a great benefit of this version. You can send and receive e-mail, view your **calendar**, and **schedule** meetings, **appointments**, or tasks from your **Web** browser. However, you have to download new Web mail templates from Lotus' Web site to give remote users a full range of capabilities. Without the templates, you only have the ability to view the databases. In future releases, Domino will ship with Web mail templates, but for now they are only **available** from the Web site.

The remote-access client has not changed with this version, and it

still provides users with all the functions of the desktop client. Our only complaint is that the replication process took a little too long.

Lotus also provides you with the Personal Web Navigator for searching the Web and storing favorite sites in a common database. We found this to be handy when several people were doing research on the Web from different locations, because it's easy to keep track of the sites co-workers have already visited.

The Lotus solution lets you control user's Web access, provided they surf using the Personal Web Navigator. You can selectively give users access to and from the Web and monitor the sites they visit. Even if you're not concerned about your employees playing on the Web, you might want to avoid bogging down the connection at crucial times.

The integration of Lotus Organizer personal information manager's calendar and scheduling features into the latest version of Notes is one of the best reasons for upgrading. The scheduling feature lets you find free time for meetings and other resources, such as conference rooms or equipment. When you request a meeting, an e-mail is sent to those users who are invited, and they can choose to accept, decline, delegate, or suggest an alternate time. If you have something already scheduled for the suggested time frame, the application sends a warning that you have a conflict and asks for a confirmation. The calendar and scheduling code is **available** to developers so they can add this feature into other Notes applications.

Notes' stellar searching capability is maintained in this version. You can search for words and phrases inside document attachments or across folders and databases using Boolean or simple character searches.

The Lotus solution also includes a lot of sample template databases and forms that you can modify to create customized workflows, but there are few easy-to-use wizards or helpers to make developing applications straightforward. The applications we developed in Notes with Windows 95 ran on Mac and Windows 3.1 platforms.

We liked the ease with which we could create a link to the Web. By simply typing the URL, Notes recognizes and underlines the site as a link. URLs can be launched from within messages, from a menu item, or from the Personal Web Navigator. You can also embed a live Web page into a message, and the page will maintain its links.

Despite these improvements, the Lotus solution has room to grow. Domino still doesn't have a document check-in and check-out facility, so if two or more people try to save changes to the same file, they will get replication conflicts. However, Lotus recently announced a Domino add-on called Domino.Docs that will do revision control and document management. It will ship at the end of the second quarter, priced at \$4,275.

Domino lets you view or launch a variety of document types, even if you don't have the associated application loaded on your system. However, we couldn't find a way to view attachments directly in the browser; we had to download and view them using the associated application.

You can view OLE objects on any client, but you can only open and edit them on clients that house an application that can handle the OLE object.

We liked the agents for processing mail and automating other tasks, but we wish Lotus provided more wizards or other helpers to make creating the agents easy.

Microsoft solution

The components

* Microsoft Exchange Server 5.0

Microsoft has made several strides with Exchange to make electronic group collaboration a reality. However, some issues, such as the server's dependence on Microsoft products for operation, still need to be addressed. You must be running Windows 95 or Windows NT 4.0 on the desktop if you want to take advantage of the Outlook 97 client. And if you are a NetWare shop, you have to install Windows NT into the NetWare environment.

If you're already running Exchange 4.0 on Macintosh or Windows 3.1, plan on upgrading your OS or don't bother to upgrade the application. The package comes with an Exchange client for Mac and Windows 3.1, but it suffers from having the inbox and public-folders list in one view with a separate application -- Microsoft Schedule+ -- for the calendar, task management, and scheduling functions.

For those already humming along with the latest Microsoft technology, the new version of Exchange will give you lots to cheer about. The Outlook

97 client is a great addition, providing users with a smart interface that runs circles around the old client. Wizards have been introduced that make the application pleasantly easy to set up, and the SMTP gateway and Network News Transfer Protocol service are extremely well-integrated and easy to configure. We also noticed a slight improvement in speed over the last version, which was woefully slow.

Installing and configuring Exchange is a breeze. Enhancements such as the Internet Mail wizard make it much easier to set up and send messages across the Internet. The other solutions require more manual configuration and expertise behind the scenes.

Exchange can only run on an NT server and requires Microsoft's Internet Information Server and Active Server Pages, which are included in NT, for Web integration. You can only administer Exchange from an NT server or workstation; you can't administrate remotely or from a Web browser like you can with the Lotus solution. However, Exchange does provide a clean interface for importing both Windows NT and NetWare users.

Exchange offers the same monitoring tools as the previous versions through the NT performance monitors, which are a function of NT.

Outlook offers some big automation improvements, such as automatic e-mail response, integrated forms creation, and contact management. You can easily schedule message delivery and enable the Voting Buttons feature, which lets you respond to a message by simply clicking on one of the quick-response buttons. You also can set an expiration date for a message and request a delivery and return receipt from a tab right on your mail message.

Outlook offers customizable views that represent each of the groupware functions, such as e-mail, schedule, or contacts. You can sort, group, and filter any of the items within the views by different criteria. For instance, you can pull up all messages from one e-mail address or arrange your activities in order of importance.

Microsoft continues to use public folders to store documents and other data, as well as to conduct discussions. There are no document-management capabilities, such as a formal document store or check-in and check-out process.

The remote-access viewer for both Outlook and Exchange is easy to use and provides all the capabilities of the desktop clients. The Outlook remote client relies on Microsoft's Remote Access Server, and the Exchange remote client ships with Shiva's ShivaRemote for dial-up access.

Exchange lets you send an e-mail containing a URL, but you can't embed a Web page in an e-mail message, as you can with Notes. You also can search the entire contents of Outlook to look for occurrences of a word or phrase.

Microsoft has done a good job of integrating Web access into the server side, but it hasn't provided enough of the capabilities of the standard Exchange client or the Outlook client. The Active Server Pages that ship with the product only give you the ability to send mail and see the public folders via the Web; you can't see the calendar or assign and work on tasks. However, the Web client interface looks exactly like an Outlook client, which should reduce the amount of end-user training.

Outlook offers a variety of forms that give developers greater flexibility for building custom applications. Like their Forms Designer predecessors, the Outlook forms are still easy to create, yet they've been further improved to let you build more complicated workflows within the confines of the client. But you must be running the Outlook client to benefit from the Outlook forms.

Novell solution

The components

* GroupWise 5 * InForms 4.1

We were impressed with the performance of the Novell solution in most testing categories; however, the application does not offer a built-in forms designer or other workflow features. Instead, you have to rely on InForms, which doesn't integrate well with the GroupWise server. Novell has plans to release a new version of GroupWise WorkFlow in June that will work with the GroupWise server to enable users to create routing forms and track the status of a project. Until this happens, we don't recommend that you upgrade.

If you're looking for a groupware product to implement now, Novell's latest offering is still a good choice for those who are currently invested in NetWare. The biggest administration improvement is its complete

integration with NetWare. With this integration, all the administration now takes place under the NetWare Administration utility instead of a separate program. This single-point administration is a huge improvement over the last version and is something that the other programs fail to offer, but you'll need to have someone on staff with a complete understanding of NetWare 4.1.

The Novell solution requires a NetWare server to run, but Novell was kind enough to include a run-time version in the box. Adding the application to the server is a simple task, but setting up gateways is more grueling than necessary because the documentation leaves out pertinent information to guide you. Be prepared to spend some time on the phone with technical support -- we did.

As with older versions of GroupWise, NetWare users can be imported or manually created from each individual user with this solution. Unlike the other solutions in this comparison, GroupWise had no options for directly importing Windows NT users.

Web access is automatically granted to all users, but administrators have fewer options for restricting Web access than with the other solutions. Whatever networking restrictions you can set through NetWare will also apply to the GroupWise server.

Novell has updated the GroupWise client interface to a three-pane view that is similar to Notes and Exchange. The updated version offers a 32-bit client for Windows 95, a new 16-bit client for Windows 3.x, and a Web client that can be accessed by most browsers. GroupWise offers similar capabilities on 16-bit and 32-bit platforms, except you can't manage documents with the 16-bit version.

GroupWise integrates with many desktop applications and offers support for a wide range of file types. It also has convenient options to have mail messages forwarded to a phone or pager number.

GroupWise WebAccess lets you access most of the features of the Windows client through the World Wide Web. You can log on, check your e-mail, assign tasks, and schedule appointments without problems.

Users will also appreciate the calendar and scheduling features and document-management capabilities. All of the features are now located in one view, which means you can easily switch between the calendar and your inbox without opening and closing windows. We liked the clarity of the calendar views, which display appointments and tasks, although the ability to change the scale (displayed in days, weeks, or months) directly from the calendar view would be a welcome improvement. Instead, you have to delve into the preferences dialog boxes to change the view, which took us a while to figure out.

In addition to shared folders, the Novell solution offers a smart document management system that lets users check documents in and out and create a version list, even from a remote location.

With this version, Novell fixed a problem with meeting invitations that occurred in GroupWise 4.1. Before, your name wasn't automatically included if you sent an invitation to a group; you had to manually add your name. Now, the sender is automatically listed at the top. You also can schedule conference rooms and other resources, as long as the administrator creates them as GroupWise objects in the Novell Directory Services.

Setting up the remote access was not as straightforward as we would have liked. We struggled with it until Novell's technical support showed us a kludgy way to start the remote client. The remote access client gives you access to all the features and offers you replication options for downloading entire files or only the sections you need.

As with the Lotus solution, users have easy access to URLs from within the GroupWise client: Doubling clicking on a URL will launch the installed browser.

You have to use InForms to design and route electronic forms and collect data. Although we liked InForms as a stand-alone product, it doesn't integrate well with the latest version of GroupWise because it is made for GroupWise 4.1. For example, when we installed InForms after installing the GroupWise client under Windows 95, InForms only found Messaging API (MAPI) as a mail transport. Therefore, when we sent forms via mail, the system utilized MAPI instead of the GroupWise mail transport. And because we had to rely on the meager set of tools provided by InForms, we couldn't find a way to enhance a form by inserting an OLE object, such as a Microsoft Word document. Further, we couldn't view our forms over the Web.

On the bright side, InForms is ODBC-compliant.

Report Card Intraware solutions

Lotus solution Lotus Domino 4.5 server Lotus Notes 4.5 client Lotus Development Corp. Cambridge, Mass. (800) 346-1305; (617) 577-8500
<http://www.lotus.com>

(Weighting)

Performance:

Implementation (10%) Good 0.6 The Domino server has no seamless options for importing NetWare users. We had difficulty configuring some options, such as the SMTP and MIME gateways. Domino offers a wide range of platform support, integrates with Windows NT and common desktop applications, and supports most browsers.

Administration (15%) Very Good 1.2 The Lotus solution has more flexible administration options than the others, but its lack of wizards kept it from receiving a higher score. You can administer the system from many locations, including a Web browser. Domino offers quality administration tools for setting alerts and provides strong security with encryption keys. Administrators can place limits on the Web sites that users visit.

Collaboration (20%) Very Good 1.6 The Lotus solution handles most collaboration tasks with ease. The calendar and scheduling features offer flexibility and are well-integrated with e-mail. There is no schedule viewer, as there is in Exchange and GroupWise. Instead, you have to start a new meeting template, add users, then check their schedules. You can easily search across databases for keywords and phrases.

Accessibility (15%) Very Good 1.2 You can access the Lotus solution from the desktop, the World Wide Web, or a remote client; all paths offer similar functions. Notes has a built-in Web browser, the Personal Web Navigator, that lets you search the Web and store sites in a shared database. It is the only solution that provides the same interface across all platforms and lets you embed a Web page in a message.

Automation (15%) Very Good 1.2 The Lotus solution is highly customizable, but developing applications is difficult. Lotus provides sample databases and forms in the box. The agents used to process incoming mail are powerful but difficult to set up. Notes, like Exchange, lets you develop views and templates for the Web.

Support and price:

Documentation (5%) Satisfactory 0.2 Lotus' hard-copy documentation is detailed, with a thorough guide to application development, but the online help is frustrating and useless.

Technical support (5%) Very Good 0.4 Lotus' technical support staff is pleasant and answered most of our questions quickly.

Support policies (5%) Good 0.3 Lotus offers 30 days of free technical support weekdays from 8 a.m. to 8 p.m. Eastern time. You also get a 60-day money-back guarantee and support via the Web, e-mail, and fax.

Cost of ownership (10%) Good 0.6 The average cost of the Lotus solution is \$34,690 for 500 users.

Final score 7.3

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